RECORD OF DECISION
"MONITORING ONLY" (NO ACTION) ALTERNATIVE SELECTION DECLARATION

SITE NAME AND LOCATION

Whittier Narrows Operable Unit
San Gabriel Valley Superfund Site, Areas 1 through 4
Los Angeles County, California

STATEMENT OF BASIS AND PURPOSE

This decision document represents the selection of the "Monitoring Only" Alternative for the Whittier Narrows Operable Unit in Los Angeles County, California, one of six operable units for the San Gabriel Valley Superfund Site, Areas 1 through 4. This decision was made in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and the National Contingency Plan (NCP). This decision is based on the Administrative Record File for this operable unit.

The State of California concurs with this decision.

DESCRIPTION OF THE "MONITORING ONLY" (NO ACTION) ALTERNATIVE

The "Monitoring Only" Alternative selected for the Whittier Narrows Operable Unit will include the installation of up to nine additional multiport or cluster groundwater monitoring wells plus approximately eight single point wells. The installation of these additional wells will enhance the existing groundwater monitoring network at the operable unit. Sampling and analysis of groundwater from the new monitoring wells will be conducted quarterly for one year, then adjusted upon review of validated analytical results and seasonal fluctuations. The current sampling and analysis schedule will be followed for the existing groundwater monitoring network (and will also be adjusted pursuant to validated analytical results and seasonal fluctuations as necessary). In addition to the installation of new monitoring wells, well logging and depth-specific sampling will be performed at approximately ten production wells located within the Whittier Narrows area. Additional well logging and depth specific sampling may be required depending on the results of the depth specific sampling of the initial ten wells. New groundwater monitoring wells will be installed using a phased approach. The "A" priority multiport wells and the single point wells will be installed as a first phase, most of which are located along the northern boundary of the operable unit. The "B" priority multiport wells, if needed, will be installed as a second phase, after monitoring results are evaluated from the "A" priority multiport wells, the single depth wells and local water level measurements.

DECLARATION

Based on the currently available data, no remedial action is necessary to ensure protection of human health and the environment. Because future groundwater conditions within the operable unit may change as groundwater flows through the area, the groundwater will continue to be monitored and results evaluated, in an annual summary report, to verify continued protection of human health and the environment. A five-year review will be performed for the Whittier Narrows Operable Unit, at which time more information on factors affecting the groundwater quality within the operable unit will be available, and EPA's decision will be revisited. The five-year period to be used for the review will start when field work (installation of monitoring wells) commences.

John Wise 3.31.93

John Wise, Acting Regional Administrator Date

RECORD OF DECISION
"MONITORING ONLY" (NO ACTION) ALTERNATIVE SELECTION
DECISION SUMMARY

1.0 OPERABLE UNIT NAME, LOCATION, AND DESCRIPTION

1.1 OPERABLE UNIT NAME

Whittier Narrows Operable Unit
San Gabriel Valley Superfund Site, Areas 1 through 4
Los Angeles County, California

1.2 OPERABLE UNIT LOCATION

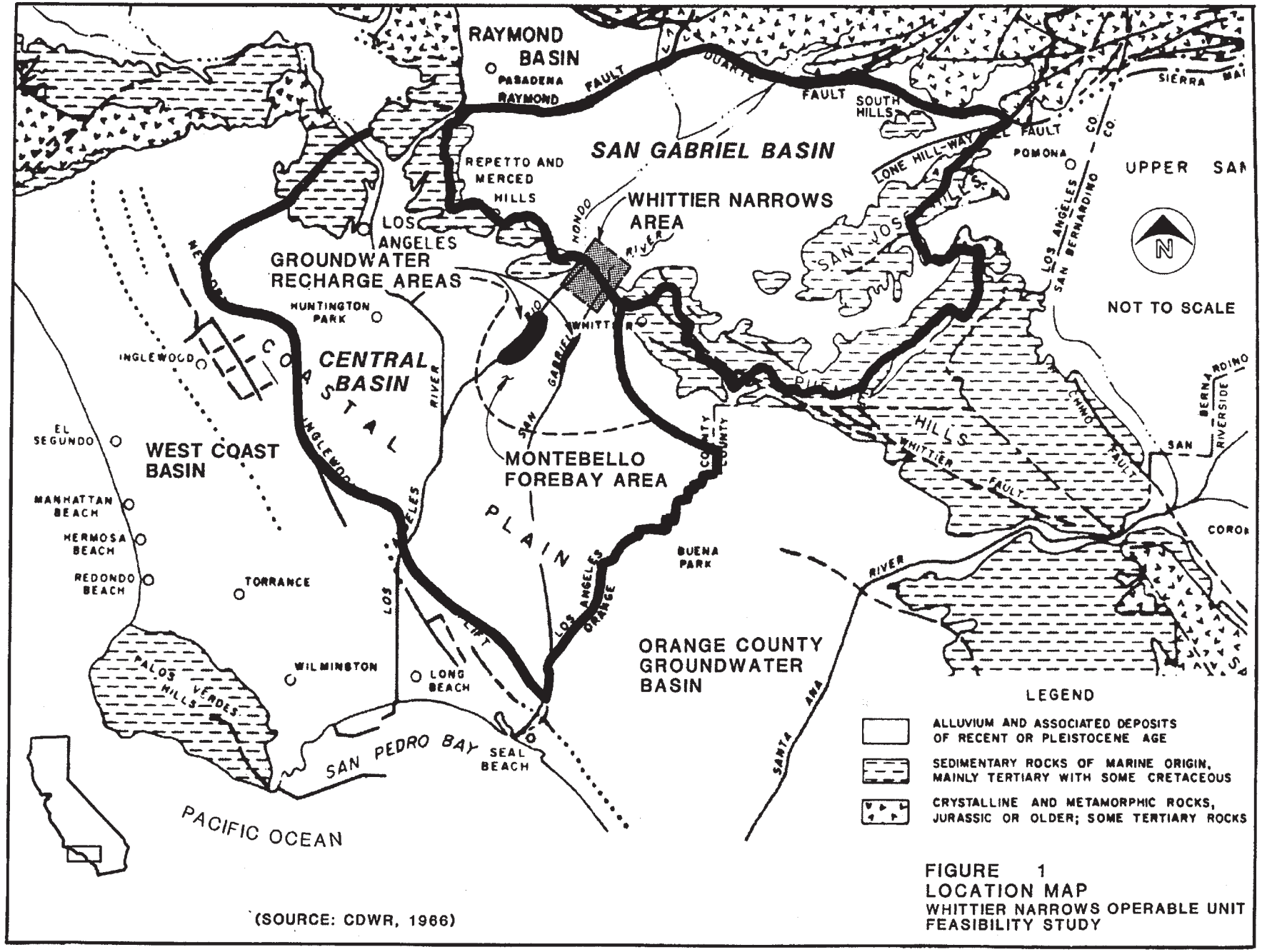
The Whittier Narrows Operable Unit (OU) is located in Southern California in eastern Los Angeles County near the San Bernardino County border as shown in Figure 1. The OU area is situated primarily to the south of State Route 60 (the Pomona Freeway) and mostly to the west of Interstate Route 605 (the San Gabriel River Freeway). The OU is bisected by Rosemead Boulevard. The nearest residential areas are South El Monte and South San Gabriel to the north and Montebello and Pico Rivera to the south.

1.3 OPERABLE UNIT DESCRIPTION

The San Gabriel Valley Superfund Site, Areas 1-4, consists of large areas of groundwater contamination from many sources. The groundwater is contaminated mainly with various volatile organic compounds, such as trichloroethene (TCE) and tetrachloroethene (PCE) that have been used in manufacturing processes and in cleaning and degreasing operations.

The OU consists of the area between the 1-1/2-mile-wide gap in the low lying hills, that serves as the boundary between the San Gabriel Basin and the Central Basin. This area constitutes the southernmost portion of the San Gabriel Valley Superfund Site, Areas 1 through 4, to the Pomona Freeway (see Figure 2). The OU is bordered on the west and northwest by the Montebello Hills and on the east and southeast by the Puente Hills.

The San Gabriel River and Rio Hondo River are two major rivers located within the OU boundaries. Much of the OU is used for flood control, with compatible secondary uses such as golf courses, equestrian areas, camp grounds, and recreational parks. The Whittier Narrows Flood Control Dam is the designated boundary between the San Gabriel Basin and Central Basin (see Figure 2). Other land use in the OU consists of residential, commercial, or light industrial. Most of the



(SOURCE: CDWR, 1966)

FIGURE 1
LOCATION MAP
WHITTIER NARROWS OPERABLE UNIT
FEASIBILITY STUDY

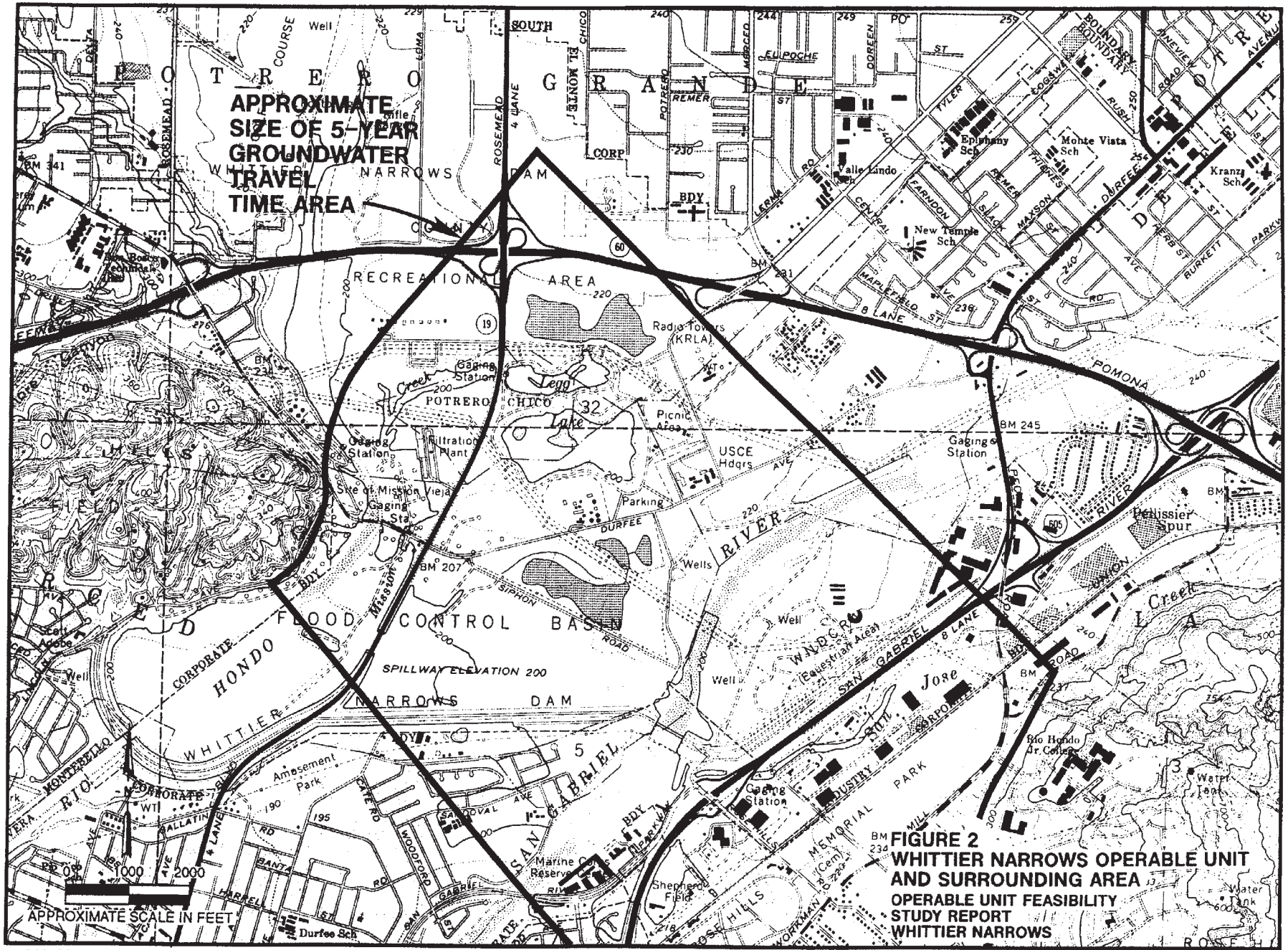


FIGURE 2
WHITTIER NARROWS OPERABLE UNIT AND SURROUNDING AREA
OPERABLE UNIT FEASIBILITY STUDY REPORT WHITTIER NARROWS

LA069126.11.01

area that is not restricted to flood control or recreation is fully developed (these areas are limited to the extreme northeast portion of the OU.

Groundwater, from 14 production wells, is currently used for domestic, industrial, and agricultural purposes.

1.3.1 Geology

Whittier Narrows was formed by erosion, faulting, and subsequent filling with alluvium of a gap between the Montebello Hills to the west and the Puente Hills to the east.

The San Gabriel Mountains form the northern boundary of the San Gabriel Basin and range from 900 feet at the base to over 10,000 feet above mean sea level (msl) in elevation. The San Gabriel Mountains are comprised primarily of Cretaceous and older rocks including quartz diorite, granite, gneiss, schist, and associated dikes and inclusions. The Repetto, Merced, Puente, Montebello, and San Jose Hills bound the basin along the southwest and southeast. These hills are composed of primarily Tertiary marine sedimentary rocks consisting of sandstone, siltstone, and shale locally interbedded with conglomerate and cut by volcanic dikes.

The San Gabriel Basin is a broad piedmont plain with an average slope of about 65 feet per mile. Ground surface elevations range from about 900 feet above msl in the north to about 200 feet above msl at Whittier Narrows Dam. The basin contains alluvium and assorted deposits of Recent and Pleistocene age. The San Gabriel Mountains and, to a lesser extent, the flanking low hills are the sources of the basin-fill sediments, which reach a maximum depth of approximately 4,000 feet in the southwestern portion of the basin.

Sedimentary rocks of the Quaternary and Tertiary age occur in the northeastern portion of the Central Basin (the area referred to as the Montebello Forebay). These rocks are categorized as either alluvium, sediments of the Upper and Lower Pleistocene age, or sediments of the Tertiary age. The alluvium is primarily unconsolidated gravel, sand, and silt deposited by streams. Alluvium generally occurs from the ground surface to about 100 to 200 feet below ground surface (bgs). The sediments underlying the alluvium consist of the Lakewood and San Pedro Formations and are of the Upper and Lower Pleistocene Age. The Lakewood Formation is generally comprised of gravel, sand, silt, and clay, and occurs from about 100 feet bgs to 250 feet bgs. The San Pedro

Formation is composed of stratified sand with some beds of fine gravel, silty sand, and silt. The San Pedro Formation occurs from about 200 feet bgs to about 900 feet bgs. Sediments in the San Pedro Formation are offset more by faults than in the Lakewood Formation sediments. Except for the geologic faults, which offset these formations, the stratigraphy within the OU is generally flat lying.

Tertiary rocks in the Whittier Narrows are divided into the Pico and Repetto Formations, older sediments and volcanic rocks, and other undifferentiated rocks. The Pico Formation is composed of sand, silt, and clay of marine origin, interbedded with gravels. Layers of gravel and sand range in thickness from 20 to 100 feet and are interbedded with micaceous siltstone and clay. The Repetto Formation is generally composed of siltstone with layers of sandstone and conglomerate. The older sedimentary rocks include the Puente Formation, which contains mostly siltstone and shale, with lesser amounts of sandstone and conglomerate. The Topanga Formation also occurs in the Central Basin area and consists of shale, sandstone, and conglomerate. Volcanic rocks include calcic andesite flows, tuffs, and volcanic breccias. The volcanic rocks are interbedded with sedimentary rocks of the Topanga Formation in some areas.

Compared to the rest of the San Gabriel Basin, the geology of the Whittier Narrows is relatively well characterized to depths of at least 400 feet because of the density of well logs. Oil wells to the west and water wells to the east are particularly abundant in the vicinity of the Whittier Narrows Dam, and water wells are somewhat abundant along the San Gabriel River and Rio Hondo River below the dam. At greater depths, the geology is generalized and well logs must be examined individually for local details. Several very thick (several hundred feet) clay and gravel layers occur locally at depths greater than 400 to 500 feet bgs, based on data from a limited number of very deep wells.

1.3.2 Hydrogeology

The San Gabriel Basin aquifer consists of the alluvial sediments deposited in the San Gabriel Basin. Over 300 production wells pump over 200,000 acre-feet per year of groundwater from the San Gabriel Basin.

In the Central Basin, the aquifers of the Lakewood and San Pedro Formations are in places separated by low-permeability materials. In stratigraphic order, these aquifers are: the Gaspur-Ballona, Exposition-Artesian,

Gardena-Gage, Hollydale, Jefferson. Lynwood, Silverado, and Sunnyside. The lateral and vertical extent of clay, silt, and sandy-clay layers is poorly defined. In some areas, individual aquifers in the Lakewood and San Pedro Formations are not separated by low-permeability materials and may directly overlie each other. However, between the Silverado and Sunnyside aquifers of the San Pedro Formation, a layer of low-permeability materials exists that is laterally continuous over much of the Whittier Narrows area and the northeastern portion of the Central Basin.

Aquifers in the Whittier Narrows occur in the alluvium in addition to the Lakewood and San Pedro Formations. The formations older than the San Pedro Formation typically have very few production wells.

Available well logs indicate that Whittier Narrows and the adjacent part of the Montebello Forebay have the same general characteristics of the San Gabriel aquifer (i.e., discontinuous interfingering lenses of alluvial deposits) with typical yields of 500 gallons per minute or greater. Zones producing groundwater to wells in Whittier Narrows are generally composed of sand and gravel. These zones may be laterally continuous with aquifers of the Lakewood and San Pedro Formations in the Central Basin. These aquifers are generally flat-lying, except for the area adjacent to the Rio Hondo and Pico fault systems.

The geologic materials in the Whittier Narrows vary from clay to gravel over short distances, and the hydraulic conductivity is expected to vary by several orders of magnitude within the vertical interval that a well may penetrate. Hydraulic conductivity values estimated from aquifer tests in the Whittier Narrows range from near one feet per day to over 1,000 feet per day.

In the San Gabriel Basin, estimates of specific yield based on well logs, range from 3 percent near the peripheral areas of the basin to 24 percent in the central portion of the basin. Values of specific yield are greater near the mountains and in the center of the basin where the clay content of the alluvium is small. This analysis indicates that the specific yield within the Whittier Narrows ranges from 10 to 20 percent.

Groundwater pumping in Whittier Narrows for potable water uses occurs at the City of Whittier and Suburban Water Systems well fields. These wells have produced an average of 16,000 acre-feet per year of groundwater from 1977 to 1990.

2.0 OPERABLE UNIT HISTORY AND ENFORCEMENT ACTIVITIES

The U.S. Environmental Protection Agency (EPA) identified the San Gabriel Valley as a Superfund site due to the detection of a variety of volatile organic contaminants in the groundwater and surface waters in the San Gabriel Basin and the risk or potential risk to people consuming the water. EPA listed this site as the San Gabriel Valley Superfund Site, Areas 1 through 4, on the National Priorities List in 1984.

Since impacted groundwater from sources within the San Gabriel Valley Superfund Site, Areas 1 through 4, must first flow through the Whittier Narrows before exiting the San Gabriel Basin, EPA identified the Whittier Narrows as an operable unit to address groundwater contamination potentially flowing into the Central Basin. EPA evaluated groundwater quality data within the OU to determine what risks are posed by groundwater conditions within the OU to determine if it is necessary to limit or control the migration of impacted groundwater through the Whittier Narrows. Whittier Narrows is one of six OUs (see page 8) that EPA has designated for investigation in the San Gabriel Valley.

EPA is pursuing overall remediation of the San Gabriel Valley Superfund Site, Areas 1 through 4, at two levels: 1) via a Superfund Cooperative Agreement with the Los Angeles Regional Water Quality Control Board (LARWQCB). The LARWQCB is the lead agency for investigations and remediation of soil and shallow groundwater at individual facilities (source investigations) throughout the San Gabriel Basin, and 2) EPA-lead investigations and remediation of deeper, regional groundwater contamination potentially originating from multiple facilities. These two elements are being implemented concurrently within the San Gabriel Basin.

To date, over 300 General Notice letters have been issued, by EPA, to potentially responsible parties throughout the San Gabriel Valley. Special Notice letters will be issued for the Baldwin Park and Puente Valley OUs in 1993.

EPA had previously prepared a Feasibility Study for Whittier Narrows in 1989 which evaluated various remedial alternatives, based on computer modeling predictions of increasing contamination levels in Whittier Narrows. Subsequent groundwater monitoring did not support these modeling predictions. Based on the groundwater monitoring data and the hydrogeologic complexity of the area, EPA has decided that it will no longer rely on computer modeling for predicting future contamination levels in this OU. (See EPA response to general comment #11 in Responsiveness Summary)

3.0 HIGHLIGHTS OF COMMUNITY PARTICIPATION

The Feasibility Study Report and Proposed Plan for the Whittier Narrows Operable Unit were released to the public in September 1992. These two documents were made available to the public in both the administrative record file and an information repository maintained at the EPA Docket Room in Region 9 and at the Whittier Central Public Library. The notice of availability for these two documents was published in the Los Angeles Times on September 15, 1992. A public comment period was held from September 16, 1992 through November 16, 1992. In addition, a public meeting was held on September 23, 1992. At this meeting, representatives from the U.S. Environmental Protection Agency, Region 9 answered questions about the OU and the "monitoring only" alternative under consideration. Following the meeting, written comments were received from state and local agencies only, not private citizens. A response to the comments received during this period is included in the Responsiveness Summary, which is part of this Record of Decision. This decision document presents the "monitoring only" alternative selected for the Whittier Narrows Operable Unit, in Los Angeles County, California, chosen in accordance with CERCLA, as amended by SARA, and the NCP. The decision for this OU is based on the administrative record.

4.0 SCOPE AND ROLE OF THE OPERABLE UNIT

The term "Operable Unit" is used to define a discrete action that is an incremental step toward a comprehensive site remedy. Operable Units may address certain geographical areas, specific site problems, initial phases of a remedy, or a set of actions over time.

This operable unit was identified, in accordance with the NCP, to address groundwater contamination in the Whittier Narrows area and potentially flowing from the San Gabriel Valley Superfund Site, Areas 1 through 4, through Whittier Narrows, and into the Central Basin. Source identification and control investigations are currently being performed by the State of California and are not a part of this Record of Decision.

The objective of this OU is to evaluate groundwater quality data within the Whittier Narrows Operable Unit to determine what risks, if any, are posed by groundwater conditions and, if necessary, limit or control the migration of impacted groundwater through Whittier Narrows.

As with many Superfund sites, the investigation at the San Gabriel Valley Superfund Site, Areas 1 through 4, is complex. As a result, EPA has organized the groundwater investigation into six distinct operable units to date: Whittier Narrows OU, Richwood OU, Suburban OU, Baldwin Park OU, Puente Valley OU, and South El Monte OU. The

Suburban OU is adjacent to the Whittier Narrows OU, while the remaining OUs are hydraulically upgradient of Whittier Narrows. Records of Decision were signed for the Richwood and Suburban OUs in 1988 and 1989, respectively. The Suburban OU Record of Decision is currently being amended to reflect current groundwater conditions of low-level contamination in Whittier Narrows. A Record of Decision for the Baldwin Park OU is scheduled to be signed by EPA in 1993.

5.0 SUMMARY OF OPERABLE UNIT CHARACTERISTICS

Table 1 lists the chemicals of potential concern, identified for the groundwater within the Whittier Narrows OU. Groundwater within the Whittier Narrows OU appears to be impacted mainly from sources located hydraulically upgradient from the OU. The LARWQCB however, has identified some potential sources within the Whittier Narrows OU and is currently investigating them. Potential routes of human exposure include the use of groundwater for domestic, industrial, and agricultural purposes, and volatilization through soil. Potential routes of environmental exposure include groundwater from production wells used for irrigation and other nondrinking water purposes.

6.0 SUMMARY OF RISKS

The information presented in this section is a summary of the Screening Baseline Risk Assessment performed for the Whittier Narrows OU and can be found, in its entirety, in the Public Review Draft, Whittier Narrows Operable Unit Feasibility Study, San Gabriel Basin, Los Angeles County California located at the information repositories at EPA Region 9 and the Whittier Central Public Library.

6.1 HUMAN HEALTH RISKS

The media of concern for this OU is groundwater. Table 2 lists the contaminants of potential concern along with the mean, maximum, and minimum concentrations detected in groundwater samples obtained at the wellhead for production wells screened over multiple intervals and from discrete intervals in the aquifer from two multiport monitoring wells and four single point monitoring wells.

Exposure to contaminants in groundwater could occur through the use of groundwater for domestic purposes. In residences, people can be exposed to contaminants from ingestion of water used for drinking and cooking. They can also be exposed through dermal absorption of contaminants, primarily during bathing and showering, and inhalation of volatile organic compounds (VOCs) released from the water into the household

Table 1 Chemicals of Potential Concern in Groundwater Whittier Narrows Operable Unit
Chemical Name
Chloroform
1,1-Dichloroethane
1,1-Dichloroethene
cis-1,2-Dichloroethene
Ethylbenzene
Styrene
Tetrachloroethene
Toluene
1,1,1-Trichloroethane
Trichloroethene
Xylene

Table 2
Chemicals of Potential Concern in Groundwater
Mean, Maximum, and Minimum Concentrations Detected
Whittier Narrows Operable Unit

Chemical Name	# Detected/ # Sampled[a]	Concentration (ug/l)			
		Arithmetic Mean[b]	Maximum Detected	Minimum Detected	Drinking Water Standard
Chloroform	1/49	0.4	0.3	0.3	100
1,1-Dichloroethane	14/51	0.4	0.6	0.2	5
1,1-Dichloroethene	11/56	0.4	1.0	0.2	6
cis-1,2-Dichloroethene	23/29	2.5	6.1	0.5	6
Ethylbenzene	4/49	0.9	20.0	0.3	680
Styrene	2/37	0.5	0.6	0.5	100
Tetrachloroethene	43/67	1.1	7.0	0.3	5
Toluene	4/49	0.9	2.8	0.3	1,000
1,1,1-Trichloroethane	5/53	0.5	2.2	0.2	200
Trichloroethene	37/63	1.4	7.0	0.2	5
Xylene	2/49	1.4	22.0	4.0	1,750

[a] Duplicate/split samples were averaged before summary statistics were calculated.
[b] The arithmetic mean was calculated using actual detected values and 1/2 the detection limit for those sampling events where the chemical was not detected.

air during showering, bathing, cooking, or by use of household appliances such as dishwashers. Exposure to contaminants in groundwater could also occur through use of groundwater for industrial purposes. Workers could be exposed through dermal absorption of contaminants or inhalation of VOCs.

Residents and workers could also be exposed to contaminants in groundwater through transport of VOCs from groundwater through soil and into ambient air or into the foundation of a building.

Additionally, groundwater from two production wells within the OU is used to fill three manmade lakes in the Whittier Narrows Recreation Area. Individuals may be exposed to contaminants in the surface water through inhalation of VOCs or through ingestion of fish. Because swimming is not allowed in these lakes, ingestion of lake water by individuals was not considered.

Based on potential exposure frequency, duration, and estimated intake exposures, residents exposed to contaminated groundwater used for domestic purposes are expected to be the maximally exposed population.

The estimated size of the exposed population in the Whittier Narrows OU is 99,400, based on the number of individuals provided drinking water from production wells located within the OU.

Table 3 presents the intake assumptions used to estimate the average and reasonable maximum exposure to chemicals in groundwater used for domestic purposes.

6.2 TOXICITY ASSESSMENT

Toxic response depends on the dose or concentration of the substance. Toxicity values are a quantitative expression of the dose-response relationship for a chemical. Toxicity values take the form of reference doses (RfDs) for noncarcinogenic effects and cancer slope factors (CSFs) for carcinogenic effects. Both RfDs and CSFs are specific to the exposure route.

RfDs have been developed by the EPA for indicating the potential for adverse health effects from exposure to chemicals exhibiting noncarcinogenic effects. RfDs, which are usually expressed in units of milligrams per kilogram per day (mg/kg-day), are estimates of lifetime daily exposure levels that should not pose an adverse health effect for humans, including sensitive individuals. Estimated intakes of chemicals from environmental media (e.g., the amount of chemical ingested from contaminated drinking water) can be

compared to the RfD. RfDs are derived from human epidemiological studies or animal studies to which uncertainty factors have been applied (e.g., to account for the use of animal data to predict effects on humans). These uncertainty factors help ensure that RfDs will not underestimate the potential for adverse noncarcinogenic effects to occur.

The dose-response relationship for carcinogens is expressed as a CSF. Generally, the slope factor is a plausible upper-bound estimate of a response per unit intake of a chemical over a lifetime. The approach used to estimate the slope factor from animal studies or human data assumes a dose-response relationship with no threshold (i.e., even the smallest exposure may produce a carcinogenic response). There is uncertainty and conservatism built into the risk extrapolation approach (where results of animal and human studies are applied to the human population). Cancer risks estimated by this method produce an estimate that provides a rough but plausible upper limit of risk (i.e., it is not likely that the true risk would be much more than the estimated risk, but it could be considerably lower).

Table 4 presents the RfDs and CSFs for the contaminants of potential concern.

6.3 RISK CHARACTERIZATION

Excess lifetime cancer risks are determined by multiplying the intake level with the CSF. These risks are probabilities that are generally expressed in scientific notation (e.g., $1x10^{-6}$). An excess lifetime cancer risk of $1x10^{-6}$ indicates that, as a plausible upper bound, an individual has a one in a million chance of developing cancer as a result of a site-related exposure to a carcinogen over a 70-year lifetime under the specific exposure conditions of a site. EPA's acceptable risk range is 10^{-4} to 10^{-6}, meaning 1 in 10,000 to 1 in 1,000,000 chance of <u>excess</u> cancer.

Potential concern for noncarcinogenic effects of a single contaminant in a single medium is expressed as a hazard quotient (HQ) (or the ratio of the estimated intake derived from the contaminant concentration in a given medium to the contaminant's RfD). By adding the HQs for all contaminants within a medium or across all media to which a given population may reasonably be exposed, the Hazard Index (HI) can be generated. The HI provides a useful reference point for gauging the potential significance of multiple contaminant exposures within a single medium or across media.

A summary of estimated risks for residential exposure to groundwater from the Whittier Narrows OU is presented in Table 5 for noncarcinogenic effects and Table 6 for carcinogenic

Table 3
Intake Assumptions Used In Future-Use Scenarios
Whittier Narrows Operable Unit

Parameter	Intake Value (Adult)	
	Average	Reasonable Maximum
Ingestion Rate[a]	2 liter/day	2 liter/day
Body Weight	70 kg	70 kg
Exposure Frequency Exposure Duration Years in Lifetime	350 days/year 9 years 70 years	350 days/year 30 years 70 years

[a] The dose from inhalation of VOCs is assumed to be equivalent to the dose from ingestion of 2 liters/day.

Table 4
Dose-Response Variables for Chemicals of Concern
Whittier Narrows Operable Unit

Chemical	Systemic Toxicity (mg/kg/day)					Carcinogenic Potency (mg/kg/day)[1]						
	Critical Effect	Oral RfD	Source	Inhalation RfD	Source	Tumor Site	Oral Slope Factor	Weight of Evidence[2]	Source	Inhalation Slope Factor	Weight of Evidence[2]	Source
Chloroform	Liver	0.01	IRIS	--	IRIS	Liver, Kidney	0.0061	B2	IRIS	0.081	B2	IRIS
1,1-Dichloroethane	Liver	0.1	HEAST	0.1	HEAST	Mammary, Liver	--	C	IRIS	--	C	HEAST
1,1-Dichloroethene	Liver	0.0009	EPA	--	IRIS	Kidney, Adrenal	--	C	EPA	--	C	EPA
cis-1,2-Dichloroethene	Blood	0.01	HEAST	--	IRIS	--	--	D	IRIS	--	D	IRIS
Ethylbenzene	Liver, Kidney	0.1	IRIS	0.3	IRIS	--	--	D	IRIS	--	D	IRIS
Styrene	Blood/Liver	0.2	IRIS	--	IRIS	Lung, Bronchi, Leukemia	0.03	B2	HEAST	0.002	B2	HEAST
Tetrachloroethene	Liver	0.01	IRIS	--	IRIS	Liver, Leukemia	0.051	B2	HEAST	0.002	B2	HEAST
Toluene	CNS, Eyes, Nose, Liver, Kidney	0.2	IRIS	0.6	HEAST	--	--	D	IRIS	--	D	IRIS
1,1,1-Trichloroethane	Liver	0.09	HEAST	0.3	HEAST	--	--	D	IRIS	--	D	IRIS
Trichloroethene	--	0.006	ECAO	--	IRIS	Lung, Liver	0.011	B2	HEAST	0.017	B2	HEAST
Xylene	Liver, Nose, Throat, CNS, Fetotoxicity	2.0	IRIS	0.09	HEAST	--	--	D	IRIS	--	D	IRIS

Notes:
HEAST = Health Effects Assessment Summary Tables.
IRIS = Integrated Risk Information System.
EPA = 1,1-Dichloroethene is evaluated according to a modified-RfD approach: Group C carcinogens which exhibit weak evidence of carcinogenicity are compared to the oral RfD/10.
ECAO = Environmental Criteria and Assessment Office.
-- = Information not available.
CNS = Central Nervous System.

[2] Weight of Evidence Groups: A is Human Carcinogen; B is Probable Human Carcinogen (B1-limited evidence of carcinogenicity in humans, B2-sufficient evidence of carcinogenicity in animals with inadequate or lack of evidence in humans); C is Possible human Carcinogen; D is Not Classifiable as to Human Carcinogenicity.

Table 5
Estimated Noncancer Hazard Quotients from Domestic Use of Groundwater[a]
Whittier Narrows Operable Unit

Chemical	#Detected/ #Sampled	Concentration (µg/l)		Average Exposure		Reasonable Maximum Exposure	
		Arithmetic Mean	95 Percent UCL[b]	Ingestion	Inhalation	Ingestion	Inhalation
Chloroform	1/49	0.4	0.4	0.001	0.001	0.001	0.001
1,1-Dichloroethane	14/51	0.4	0.4	0.0001	0.0001	0.0001	0.0001
1,1-Dichloroethene	11/56	0.4	0.5	0.01	0.01	0.02	0.02
cis-1,2-Dichloroethene	23/29	2.5	3.2	0.007	0.007	0.009	0.009
Ethylbenzene	4/49	0.9	1.3	0.0002	0.00008	0.0004	0.0001
Styrene	2/37	0.5	0.5	0.00007	0.00007	0.00007	0.00007
Tetrachloroethene	43/67	1.1	1.3	0.003	0.003	0.004	0.004
Toluene	4/49	0.9	1.2	0.0001	0.00004	0.0002	0.00005
1,1,1-Trichloroethane	5/53	0.5	0.6	0.0002	0.00005	0.0002	0.00005
Trichloroethene	37/63	1.4	1.8	0.006	0.006	0.008	0.008
Xylene	2/49	1.4	2.3	0.00002	0.0004	0.00003	0.0007
Total Hazard Index				**0.03**	**0.03**	**0.04**	**0.04**

[a] Exposure assumptions used are shown in Table 3.
[b] 95 Percent Upper Confidence Limit.

Table 6
Estimated Excess Lifetime Cancer Risk from
Domestic Use of Groundwater[a]
Whittier Narrows Operable Unit

Chemical	#Detected/ #Sampled	Concentration (µg/l)		Average Exposure		Reasonable Maximum Exposure	
		Arithmetic Mean	95 Percent UCL[b]	Ingestion	Inhalation	Ingestion	Inhalation
Chloroform	1/49	0.4	0.4	9×10^{-9}	1×10^{-7}	3×10^{-6}	4×10^{-7}
1,1-Dichloroethane	14/51	0.4	0.4	--	--	--	--
1,1-Dichloroethene	11/56	0.4	0.5	--	--	--	--
cis-1,2-Dichloroethene	23/29	2.5	3.2	--	--	--	--
Ethylbenzene	4/49	0.9	1.3	--	--	--	--
Styrene	2/37	0.5	0.5	5×10^{-8}	4×10^{-9}	2×10^{-7}	1×10^{-8}
Tetrachloroethene	43/67	1.1	1.3	2×10^{-7}	8×10^{-9}	8×10^{-7}	3×10^{-8}
Toluene	4/49	0.9	1.2	--	--	--	--
1,1,1-Trichloroethane	5/53	0.5	0.6	--	--	--	--
Trichloroethene	37/63	1.4	1.8	5×10^{-8}	8×10^{-8}	2×10^{-7}	4×10^{-7}
Xylene	2/49	1.4	2.3	--	--	--	--
Total Cancer Risk				3×10^{-7}	2×10^{-7}	1×10^{-6}	8×10^{-7}

[a] Exposure assumptions used are shown in Table 3.
[b] 95 Percent Upper Confidence Limit (UCL).

risk.

For average ingestion and inhalation exposures from the domestic use of tap water, the sum of the noncancer HQs is 0.03 for each route. The HI, based on an average exposure scenario, is 0.06. For the reasonable maximum exposure (RME) to groundwater from the domestic use of tap water, the sum of the noncancer HQs is 0.04 for each route. The overall noncancer HI from RME to groundwater in the Whittier Narrows is 0.09, well below the level of concern for potential noncancer health effects. When the HI exceeds 1 (i.e., intake exceeds RfD), there is a potential for health concern.

The estimated excess lifetime cancer risks for average ingestion and inhalation exposures to tap water are $3x10^{-7}$ and $2x10^{-7}$, respectively. The total estimated excess lifetime cancer risk for average residential exposure through domestic use of groundwater is $5x10^{-7}$. The estimate lifetime cancer risk for RME from tap water are $1x10^{-6}$ for ingestion exposures and $8x10^{-7}$ for inhalation exposures. The total estimated excess lifetime cancer risk for the residential RME through domestic use of groundwater is $2x10^{-6}$ which is at the lower end of EPA's acceptable risk "target range" of 10^{-4} - 10^{-6}.

6.3.1 Uncertainties

Uncertainties associated with this screening are due to uncertainties in the risk assessment process in general (i.e., the toxicological data base), specific uncertainties in characterizing the site, and uncertainties associated with describing exposures. EPA's risk assessment is conservative in nature and attempts to account for concentrations by typically overestimating rather than underestimating risks in order to ensure adequate protection of public health. Therefore, actual risks are likely to be lower (if they exist at all) than estimated risks. This screening risk assessment is subject to uncertainty from a variety of sources including:

- Sampling and Analysis
- Fate and transport
- Exposure estimation
- Toxicological data

Uncertainty associated with sampling and analysis include the inherent variability (standard error) in the analysis, representativeness of the samples, sampling errors, and heterogeneity of the sample matrix.

This screening risk assessment makes simplifying

assumptions about the environmental fate and transport of the site contaminants, specifically, that no contaminant loss or transformation occurred. The assessment also assumes that the chemical concentrations detected in groundwater remain constant during the assessed exposure duration. The choice of data to represent exposure point concentrations is an additional source of potential error.

In addition, the screening risk assessment focuses only on VOCs detected in groundwater in the Whittier Narrows OU. Other chemicals present in the groundwater, such as inorganics, may present an additional health risk not addressed in the assessment.

The estimation of exposure requires numerous assumptions to describe potential exposure situations. There are a number of uncertainties regarding the likelihood of exposure, frequency of contact with contaminated media, the concentration of contaminants at exposure points, and the time period exposure. Assumptions used in this risk assessment tend to simplify and approximate actual site conditions.

The toxicological data base is also a source of uncertainty. These uncertainties include, extrapolation from high to low doses and from animals to humans; species, gender, age, and strain differences in uptake, metabolism, organ distribution, and target site susceptibility; and human population variability with respect to diet, environment, activity patterns, and cultural factors.

6.3.2 Summary of Risks

Eleven VOCs were detected in groundwater from production and monitoring wells located within the Whittier Narrows OU. Human populations potentially exposed to VOCs present in the groundwater include individuals using the groundwater for domestic, industrial, and recreational purposes. The exposure scenario evaluated assumes a resident would come in contact with groundwater through domestic use of tap water. Based on potential for exposure frequency, duration, and estimated intake, residents exposed to contaminated groundwater used for domestic purposes are expected to be the maximally exposed population.

The groundwater exposure scenario was evaluated by estimating the noncarcinogenic and carcinogenic risks associated with it. The noncarcinogenic exposure levels do not exceed the corresponding RfDs for individual

contaminants of potential concern. The sum of the noncancer HQs for the contaminants of potential concern is 0.06 for the average exposure scenario and 0.08 for the RME scenario, both below the level of concern for noncancer health effects. The estimated excess lifetime cancer risk for residential domestic use of groundwater is $5x10^{-7}$ for the average exposure scenario and $2x10^{-6}$ for the RME scenario. In general, EPA uses 10^{-6} to 10^{-4} as its "target range" within which EPA strives to manage risks as part of a Superfund cleanup. Estimated excess lifetime cancer risks for residential domestic use of groundwater fall below this range for the average exposure scenario and at the lower end of the target range for the RME scenario.

6.4 ENVIRONMENTAL RISKS

Six VOCs were detected in groundwater from production wells in the Whittier Narrows Nature Center and Rose Hills Memorial Park. Groundwater from these production wells is currently being used for irrigation and other nondrinking water purposes. Potential environmental receptors include vegetation and wildlife exposed to groundwater in these areas. The detected VOCs will be removed from water primarily by volatilization to the atmosphere. These VOCs are not expected to significantly bioconcentrate in aquatic organisms or adsorb to sediment. A comparison of concentrations detected in these production wells to the corresponding chemical-specific acute and chronic National Ambient Water Quality Criteria (AWQC) shows that the AWQC are considerably higher (greater than 400 times) than the detected concentrations.

National Ambient Water Quality Criteria (AWQC) are published by EPA under the Clean Water Act. If not exceeded, the appropriate AWQC should protect most aquatic life and its uses (Federal Register, Vol. 45, No. 231, November 28, 1980). The freshwater AWQC for acute effects is 11,600 ug/1 for toluene. There is no freshwater AWQC for acute effects for 1,1-DCA. The freshwater AWQC for chronic effects is 20,000 ug/1 for 1,2-DCA and 840 ug/1 for PCE. There is no chronic AWQC for 1,1-DCA, 1,1-DCE, TCE, or toluene. The acute and chronic chemical-specific AWQC are considerably higher than the concentrations detected in production wells in Rose Hills Memorial Park in 1991 (maximum of 3 ug/1) and in the Whittier Narrows Nature Center in 1987-1988 (less than 1 ug/1).

7.0 DESCRIPTION OF THE "MONITORING ONLY" (NO ACTION) ALTERNATIVE

As a general policy, EPA uses the results of the risk assessment to establish the need or basis for taking a remedial action and compares a "no action" alternative to several remedial (action) alternatives. For this OU, the risk assessment established there are currently no unaccepable risks present, therefore, no remedial action and no comparison of remedial alternatives is necessary at this time.

Although the risk assessment has demonstrated that current risk at the OU is well within EPA's acceptable risk range, EPA recognizes that there is some degree of uncertainty as to the future conditions at the OU. Therefore, EPA will continue the currently operating groundwater monitoring network and supplement this monitoring program with the installation of up to nine additional multiport or cluster groundwater monitoring wells, plus approximately eight single point wells, to gather groundwater data where currently none exists. The new wells will be sampled for inorganic and organic compounds. Design and construction of the new monitoring wells will be consistent with current and potential future remedial action goals of the basinwide Superfund project.

The approximate locations of the potential additional monitoring wells are shown in Figure 3. New well locations were selected to fill data gaps in Whittier Narrows, to evaluate groundwater quality entering Whittier Narrows, to evaluate local groundwater levels and flow directions, and to serve as early warning wells for some drinking water wells. Each new well will be a multiport well (if more than three or four zones will be sampled, a cluster well (if less than three or four zones are sampled), or a single depth well. Figure 3 shows the approximate locations of the new wells. The multiport wells have been designated as "A" priority and "B" priority wells. The "A" wells, and the single point wells (at the "B" priority locations) will be installed as a first phase in order to fill data gaps downgradient of potential contaminant sources and to establish some localized groundwater flow gradients. The "B" wells, if needed, will be installed the following year, pending the results of local water level measurements and monitoring results of the "A" wells and single point wells. The well logging and depth specific sampling will be conducted concurrently (if technically feasible) with the installation of the "A" priority wells and single point wells.

In addition to the new monitoring wells, EPA will provide well logging and depth-specific sampling of approximately ten existing wells in the OU area. The locations of these wells are also shown in Figure 3.

Validated monitoring data will be shared with all interested parties. In addition, EPA will prepare an annual report summarizing

the monitoring data collected from the expanded monitoring network. This report will also be made available to all interested parties.

Should future conditions change to where an unacceptable risk is present within the OU (i.e., a risk greater than 10^{-4}, or if operating drinking water wells are threatened or impacted by groundwater contamination from the San Gabriel Valley) then EPA is prepared to take the appropriate response(s). Such response(s) may include an accelerated feasibility study to determine an appropriate remedial action and/or the need to install additional monitoring wells, or, if response time is critical, a removal action. CERCLA Section 104 authorizes removal responses whenever any hazardous substance is released or there is a substantial threat of such a release into the environment of any pollutant or contaminant which may present an imminent and substantial danger to the public health or welfare. In addition to requirements of CERCLA and the NCP, EPA removal actions will be guided by, Superfund Removal Procedures - Action Memorandum Guidance, dated December,1990, and Interim Final Guidance on Numeric Removal Action Levels at Contaminated Drinking Water Sites, OSWER Directive 9360.1-10, dated October 6, 1987. Also, removal action levels for some chemicals have been revised in a (Draft) Final Guidance on Numeric Removal Action Levels at Contaminated Drinking Water Sites, that EPA is currently evaluating. This "Final" guidance will replace the 1987 guidance once the evaluation has been completed.

If groundwater data in the Whittier Narrows OU show an unacceptable risk or a trend towards an unacceptable risk, EPA will begin to evaluate the appropriate location(s) for extraction and treatment systems. For operating drinking water wells in the San Gabriel Valley or the Central Basin that are unable to meet federal or state drinking water standards due to San Gabriel Valley contamination, EPA may determine that well head treatment or an alternative drinking water supply is necessary. Depending upon contamination levels, EPA may use its removal authority for drinking water wells threatened or impacted by San Gabriel Valley contamination because of the much quicker response time compared to EPA's remedial authority.

The type of treatment will depend upon the contaminants present and the pumping rates of the wells. However, based on treatment systems in operation in the San Gabriel Valley and Central Basin, liquid-phase Granular Activated Carbon (GAC) or air stripping may be used. Air stripping systems may require off-gas treatment to meet air quality standards. All treatment systems will be designed to meet applicable or relevant and appropriate requirements (ARARs).

Water reuse or disposal from new extraction systems will be evaluated, and will largely depend upon extraction rates and the location of the extraction system relative to the point(s) of use.

The total present worth cost associated with the implementation and operation and maintenance of phases A and B of the expanded monitoring network, plus the cost of monitoring the existing, network is approximately $ 5,200,000. This cost assumes a phased installation approach with incremental costs discounted 5 percent to the base year. Well installation is scheduled to begin in fiscal year (FY) 93. The period to be used for the five-year review will start when monitoring well installation begins.

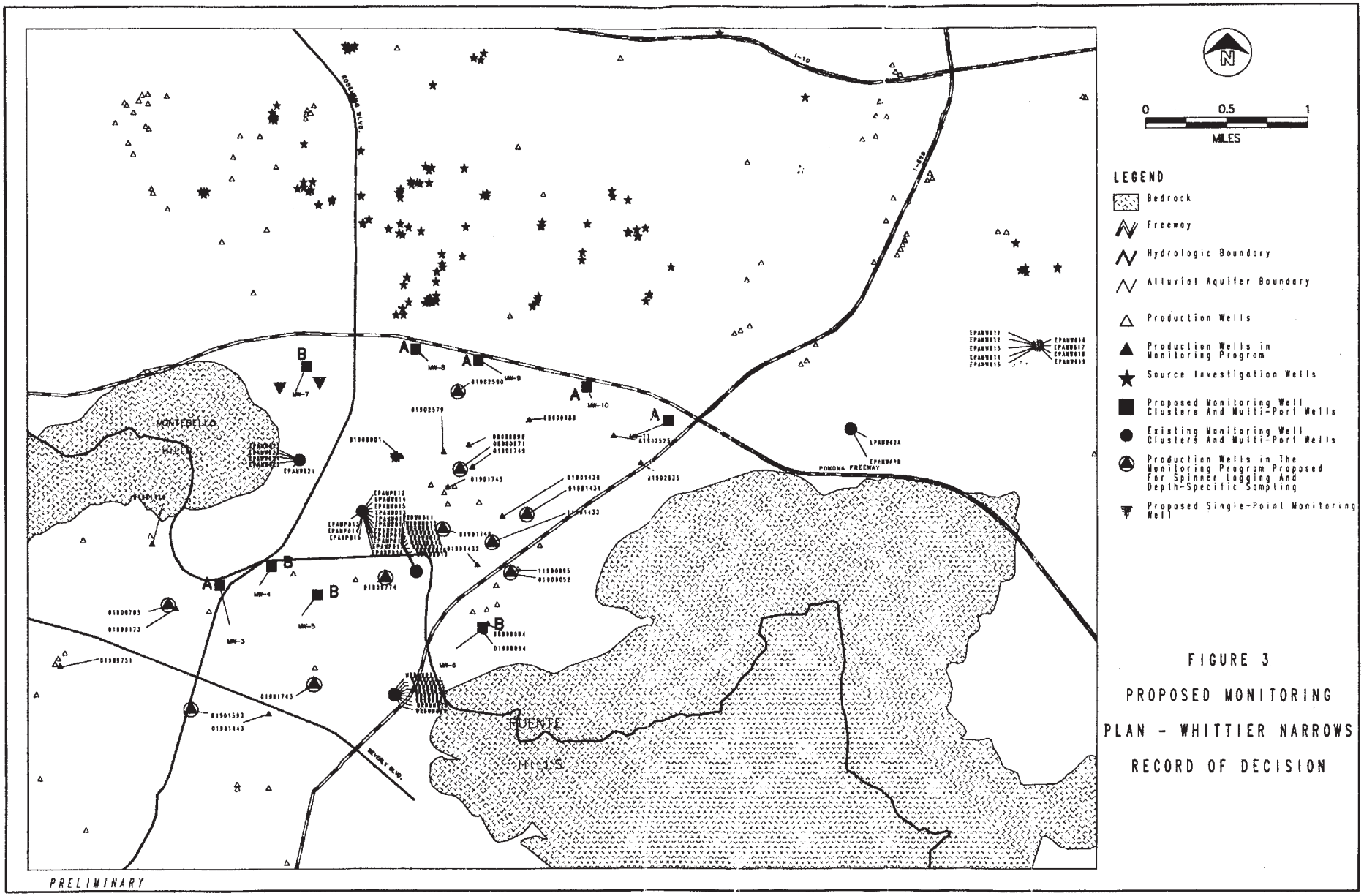


FIGURE 3

PROPOSED MONITORING PLAN - WHITTIER NARROWS RECORD OF DECISION

RECORD OF DECISION
"MONITORING ONLY" (NO ACTION) ALTERNATIVE SELECTION
RESPONSIVENESS SUMMARY

Whittier Narrows Operable Unit
San Gabriel Valley Superfund Site, Areas 1 through 4
Los Angeles County, California

A. OVERVIEW

At the time of the public comment period, the US Environmental Protection Agency (EPA) had identified a preferred alternative for the Whittier Narrows Operable Unit, Los Angeles County, California. EPA's recommended alternative ("monitoring only") addresses the need to expand the existing groundwater monitoring network at Whittier Narrows to enhance the continued monitoring of groundwater quality within the operable unit area. The preferred "monitoring only" alternative, as specified in the Record of Decision, involves the installation of additional multiport or cluster monitoring wells and single point wells within the operable unit area, as well as, additional depth-specific sampling and well logging of existing production wells. EPA recommended the Whittier Narrows Operable Unit for a five year review.

Additional monitoring work will also be performed by local agencies of the San Gabriel and Central Basins. EPA is working with these agencies to coordinate field activities and to share and evaluate monitoring data.

Judging from the comments received during the public meeting and the public comment period, concerned state and local agencies strongly agreed with the need for an expanded monitoring network at Whittier Narrows. Of major concern to these agencies was the number and location of new monitoring wells proposed to be installed and the proposed time frame recommended for their installation. Many agencies expressed a desire to be more involved in the design and implementation of the new monitoring network. In addition, the agencies recommended that a contingency plan for groundwater treatment be part of any Record of Decision. The California Department of Toxic Substances Control (DTSC) expressed the concern that EPA did not have sufficient data to characterize the risk or to conclude that no remedial action was needed at this time. DTSC was also concerned that the proposed monitoring system may not provide early detection of contamination entering the OU because of the large distances between the wells. DTSC recommended that all field work be completed within a two year time frame. EPA also received one comment letter (from a state agency) after the close of the comment period. Since the letter was received after the close of the comment period, EPA is not required to respond in the responsiveness summary. However, the main comment expressed in the letter was a general agreement with the comments contained in the comment letter submitted by the California Department of Toxic Substances Control.

No written comments were received from private citizens during

the public comment period. Oral comments received from private citizens attending the public meeting concerned drinking water quality at the tap (i.e., color, turbidity, etc.) and were not considered significant to the low-level volatile organic compound groundwater contamination at this operable unit. These citizens were referred to their local water purveyor.

These sections follow:

- Background on Community Involvement.
- Summary of Comments Received During Public Comment Period and EPA Responses.

B. BACKGROUND ON COMMUNITY INVOLVEMENT.

EPA identified the San Gabriel Valley as a Superfund site due to the detection of a variety of organic contaminants in the groundwater and surface waters in the San Gabriel Basin. The EPA listed this site as the San Gabriel Valley Superfund Site, Areas 1 through 4, on the National Priorities List in 1984. Because of the large size and complexity of the San Gabriel Basin, EPA has organized the groundwater investigation into six distinct Operable Units (OU): Whittier Narrows OU, Richwood OU, Suburban OU, Baldwin Park OU, Puente Valley OU, and the South El Monte OU.

Contaminated groundwater from sources within the San Gabriel Valley Superfund Site, Areas 1 through 4, must first flow through the Whittier Narrows before exiting the San Gabriel Basin. EPA identified the Whittier Narrows as an operable unit to evaluate groundwater quality data within the OU to determine what risks are posed by groundwater conditions within the OU and, if necessary, limit or control the migration of impacted groundwater through the Whittier Narrows.

EPA is pursuing overall remediation of the San Gabriel Valley Superfund Site, Areas 1 through 4, at two levels: 1) in cooperation with the Los Angeles Regional Water Quality Control Board (LARWQCB), LARWQCB-lead investigations and remediation of soil and shallow groundwater at individual facilities (source investigations), and 2) EPA-lead investigation and remediation of deeper, regional groundwater contamination potentially originating from multiple facilities. These two elements are being implemented concurrently within the San Gabriel Basin.

To date, over 300 General Notice letters have been issued, by EPA, to potentially responsible parties throughout the San Gabriel Valley. Special Notice letters will be issued for the Baldwin Park and Puente Valley OUs in 1993.

EPA had previously prepared a Feasibility Study for Whittier Narrows in 1989, which evaluated various remedial alternatives, based on computer modeling predictions of increasing contamination

levels in Whittier Narrows. Subsequent groundwater monitoring did not support these modeling predictions. Based on the groundwater monitoring data and the hydrogeologic complexity of the area, EPA had decided that is will no longer rely on computer modeling for predicting future contamination levels in this OU. (See EPA response to general comment #11.)

The Feasibility Study Report and Proposed Plan for the Whittier Narrows Operable Unit were released to the public in September 1992. These two documents were made available to the public in the administrative record file at an information repository maintained at the EPA Docket Room in Region 9 and at the Whittier Central Public Library. The notice of availability for these two documents was published in the Los Angeles Times on September 15, 1992.

This notice briefly described the proposed alternative and announced the public comment period and the upcoming public meeting. The notice also announced locations where the Whittier Narrows Operable Unit Feasibility Study (OUFS) report could be reviewed. The OUFS report was located in the Whittier Central Public Library and the EPA Region IX office in San Francisco.

EPA also prepared a 7-page fact sheet describing the Whittier Narrows OUFS report and EPA's recommended alternative. Copies of the fact sheet were mailed on September 14, 1992 to the general mailing list for the San Gabriel Valley Superfund site. This general mailing list consisted, at the time, of approximately 1,955 names, including elected officials, Potentially Responsible Parties (PRPs), media representatives, and representatives of various cities and water districts in the Central and San Gabriel Basins.

A public comment period was held from September 16, 1992 through November 16, 1992. In addition, a public meeting was held on September 23, 1992. At this meeting, representatives from the U.S. Environmental Protection Agency, Region 9 answered questions about the OU and the "monitoring only" alternative under consideration. A response to the comments received during this period is included in this document, which is part of this Record of Decision. The Record of Decision presents the "monitoring only" (no action) alternative selected for the Whittier Narrows Operable Unit, in Los Angeles County, California, chosen in accordance with CERCLA, as amended by SARA, and the NCP. The decision for this OU is based on the administrative record.

C. SUMMARY OF COMMENTS RECEIVED DURING PUBLIC COMMENT PERIOD

Comments received during the Whittier Narrows Operable Unit public comment period for the Feasibility Study Report and Proposed Plan are summarized briefly below. The comment period was held from September 16 to November 16, 1992. The comments are divided into two categories: General Comments are those comments that pertain to the general project approach and were common to most of the agencies submitting comments, unless otherwise stated; and Specific Comments are comments that pertain to specific technical issues of the Feasibility Study or Proposed Plan.

GENERAL COMMENTS

1. Most of the local agencies located in the San Gabriel and Central Basins stated that EPA should continue to solicit input from them regarding remedial activities in the Whittier Narrows area. Many agencies suggested that EPA designate one local agency to take the lead for developing the design and implementation of new monitoring wells. Many of these agencies also recommended a second public meeting, to be located in the Central Basin, to provide private citizens and local agencies, within the Central Basin, a better forum for expressing their comments and concerns.

   EPA Response - EPA considers one public meeting sufficient. Should the need arise, there will be other opportunities for public input as described in EPA's response to comment #2 below. Also, EPA is willing to meet with interested parties to discuss the proposed expanded monitoring network, and to meet and discuss monitoring results and potential modifications to the monitoring network. EPA will retain the lead for the design and installation of new monitoring wells and for any remedial actions as part of the Whittier Narrows Operable Unit.

2. Many of the agencies submitting comments recommended that a contingency plan be included in the Proposed Plan for the Whittier Narrows Operable Unit, since no remedial actions have been identified.

   EPA Response - Based on the results of the continuing groundwater monitoring effort and the risk assessment for the Whittier Narrows Operable Unit, EPA has determined that no remedial action is necessary at this time for the continued protection of human health and the environment. EPA recognizes however, that there is some degree of uncertainty as to the current condition in the OU. In the event that future groundwater monitoring results within the operable unit change to where an unacceptable

risk (e.g. greater than 10^{-4}) is present within the operable unit, EPA is prepared to take the appropriate response(s). Potential response actions (such as an accelerated feasibility study, additional monitoring well installation, drinking water well-head treatment, or use of EPA's removal authority) are described in the Record of Decision for the Whittier Narrows Operable Unit. EPA has met with the state and local agencies and has agreed to continued discussions of trigger criteria and potential contingency actions, outside of the framework of the Record of Decision. However, the commenters should recognize that developing trigger criteria and contingency actions will be very difficult because of lack of information regarding where contamination sources originated and where contamination may be found, the specific contaminations that may be found, where extraction systems will be located, what extraction rates should be, and what to do with the treated groundwater. EPA believes that there are too many uncertainties to developing a contingency plan with any measureable degree of accuracy. Before any remedial or non-time critical removal actions are undertaken by EPA, there will be a minimum of 30 days allowed for the general public to comment on EPA's proposed actions.

3. Water generated from Whittier Narrows project-related activities (i.e., spinner logging, groundwater sampling, etc.) should be put to the maximum beneficial use possible.

   EPA Response - EPA concurs and will do so whenever it is practicable. It should be noted that water from spinner logging, if disposed of on the ground will recharge the aquifer to a certain degree as the water percolates through the ground into the aquifer.

4. Many of the agencies submitting comments stated that the cost of assistance from local agencies or the costs associated with treatment plants required on production wells because of contamination from the San Gabriel Valley should be reimbursable from the Superfund.

   EPA Response - Unless there is a formal Cooperative Agreement between EPA and another agency, assistance (including well-head treatment) provided by local agencies is typically not reimbursed from Superfund. EPA does however appreciate the cooperative efforts of the local agencies, and may be able to provide guidance in future to the local agencies on how to recover costs from PRPs.

5. Many of the agencies submitting comments noted that treatment of groundwater should consider both Federal and State of California requirements and regulations.

EPA Response - Any removal actions taken by EPA involving treatment of groundwater, will comply with Federal, state, and local applicable or relevant and appropriate requirements (ARARs) to the extent practicable. Any remedial actions involving treatment of groundwater will comply with ARARs unless a formal waiver is deemed necessary and justified by EPA. It should be noted however, groundwater treatment was not formally evaluated in the OUFS and Proposed Plan because groundwater conditions and EPA's risk assessment do not indicate any significant risks to human health or the environment.

6. The Proposed Plan does not provide sufficient security that a remedial action will be undertaken in the Whittier Narrows Operable Unit when warranted.

EPA Response - Although a remedial action is not warranted at this time, EPA remains committed to take the appropriate remedial or removal action, if and when necessary. EPA intends to exercise its removal authority if appropriate, if a situation arises that does not permit the time required to adequately implement the remedial action process. The removal action process is described in the Record of Decision for the Whittier Narrows Operable Unit and in the National Contingency Plan (NCP). All EPA monitoring data from the Whittier Narrows monitoring network will be made available to all interested parties. In addition, EPA is willing to meet with interested parties to discuss groundwater quality data and potential contingency measures. EPA believes its remedial and removal authorities under CERCLA and the NCP, combined with its commitment to share monitoring data and to meet with interested parties, is sufficient security that remedial action will be taken if warranted.

7. Many agencies commented that the technical basis for the phased installation of the proposed new monitoring wells has not been adequately described.

EPA Response - EPA feels it is not prudent to install all the monitoring wells at this time, because installing all of the proposed new monitoring wells right away may lead to well locations that are not ideal. This approach may lead to an inefficient monitoring network and may lead to the placement of previously unneeded additional wells, thereby increasing monitoring costs. On the other hand, a phased installation approach allows for the optimum placement of any succeeding wells once the priority wells have been installed and analytical results from these wells have been assessed. EPA has in cooperation with state and local agencies, prioritized the installation of the multiport wells as "A" and "B". The "A" wells plus approximately eight single point wells will be installed first. The "B" wells will be installed

after water level measurements have been taken and monitoring from the "A" wells has been evaluated. EPA anticipates both phases of the new wells will be installed in approximately a 2 year period.

8. Many agencies commented that the approach described in the proposed plan does not offer a 5-year early warning system, as stated, but perhaps as little as 2-years.

   EPA Response - EPA believes there is at least a 5 year warning period for groundwater contamination entering Whittier Narrows from areas north of Highway 60. Of course contamination already within Whittier Narrows could reduce contamination travel time to the Central Basin. The monitoring network, however, should be able to detect this contamination and provide sufficient early warning to take appropriate actions. The travel time estimates are based on approximate continuous groundwater flow times. Conservative groundwater flows were used in these approximations. Furthermore, given EPA's removal authority and its commitment to accelerate its remedial process, EPA is confident that even a two year warning will be sufficient to respond.

9. Many local agencies commented that a data gap is present in the western segment of the Whittier Narrows that was not considered in the proposed new monitoring network.

   EPA Response - EPA has been meeting with and will continue to meet with interested parties (e.g.,state and local agencies) to refine monitoring well locations. The "final" monitoring well locations and prioritization of the placement of the wells (shown in figure 3 of the ROD) were chosen by EPA and were based on comments received by EPA. Actual field conditions and future monitoring results however, may cause some monitoring wells to be relocated from the locations depicted on figure 3 of the ROD.

10. Several local agencies stated that it is their preliminary opinion that the source of contamination (present above state and federal maximum contaminant levels) found in one well located in Pico Rivera is the San Gabriel Valley.

    EPA Response - The source of this contamination is not clear. There are potential source areas within the Central Basin which need to be evaluated. EPA is currently working with a local agency to investigate potential sources in the Pico Rivera area. Placement of new monitoring wells, as part of the Whittier Narrows Operable Unit Proposed Plan, may also assist in evaluating the source of this contamination.

11. Several agencies commented that the Feasibility Study for the Whittier Narrows Operable Unit makes no attempt to forecast future groundwater conditions within the Narrows. The study assumes that concentrations of contaminants remain constant and, therefore, the health risks remain constant. The technical basis for assuming constant contamination concentrations in the future is not adequately described. Past EPA analyses have forecast rising contaminant levels in the Narrows.

EPA Response - Current monitoring results collected by EPA have shown that contaminant levels within the Whittier Narrows area have not risen according to past predictions. Instead of an increase in contaminant levels, there appears to be a decrease in contaminant levels. Changing groundwater conditions may be affected by many complex factors, including retardation and natural attenuation of contamination, as well as upgradient remedial activities and the elimination of sources. EPA used groundwater modeling (computer modeling) in an attempt to predict future groundwater chemical contaminations. In order to be protective of public health, very conservative assumptions were used in the model (e.g. the highest chemical concentrations found in groundwater were used, and chemicals would move at the same rate as groundwater), and did not take into consideration such factors as natural attenuation, retardation, and the ongoing elimination of contamination sources. In addition, other factors affecting chemical movement in groundwater such as hydraulic conductivity and hydraulic gradients were areally averaged (simplified) to take into account variations in those parameters. However, local (as opposed to the larger areal) variations in these parameters could affect groundwater flow and therefore contaminant movement. Because it now appears the assumptions used in the model were too conservative, EPA expects from now on to rely on field data for indicating trends in contaminant levels rather than using modeling to predict contamination levels in the Whittier Narrows. Plus, the complexity of groundwater conditions there makes it unlikely that modeling can be used to accurately predict future groundwater chemical concentrations.

12. Many agencies commented that, in accordance with the Montebello Forebay protection strategy, the installation of well head treatment systems is essential for protection of the drinking water within the Central Basin.

EPA Response - Generally, EPA agrees that for production wells that cannot meet drinking water standards, well head treatment may be appropriate. EPA will evaluate any such problems which appear to be caused by contamination

from the San Gabriel Superfund sites and determine, in consultation with state and local authorities, what, if any, action is warranted.

SPECIFIC COMMENTS

1. The California Department of Toxic Substances Control (DTSC) commented that a screening risk assessment is inappropriate at the level of an OUFS. Such a risk assessment should be thorough and quantitative, per U.S. EPA guidance. DTSC also questioned the existence of a Remedial Investigation Report.

   EPA Response - The EPA refers the DTSC to OSWER Directive 9355.0-30. Contained within this document is the following: "Early and interim action RODs do not require a completed baseline risk assessment, although enough information must be available to demonstrate the potential for risk and the need to take action. Data sufficient to support the interim action decision can be extracted from the ongoing RI/FS for the site and set out in a focused feasibility study or other appropriate document that includes a short analysis of a limited number of alternatives (55 Fed. Reg. at 8704)." Because the Whittier Narrows ROD is for an interim action, the criteria for a screening risk assessment has thus been satisfied. A basinwide Remedial Investigation Report is available at the Whittier Central Public Library and in the EPA Region IX information repository.

2. The DTSC commented that this OUFS addresses only volatile contaminants in groundwater. If other organic chemicals were sought, these data are absent and not mentioned. Inorganic contaminants are surely present at this site at levels above background. Therefore, it seems highly probable that potential health risks are underestimated in the documents reviewed. At the very least, estimates of risk are made greatly more uncertain by the exclusion of these classes of chemicals, but such uncertainty is not reflected in Table 6-9 of the Feasibility Study Report.

   EPA Response - All organic chemicals that were positively detected in at least one sample were included as contaminants of potential concern (COPCs). Admittedly, inorganics were not the focus of the RI/FS or the risk assessment. The risk assessment acknowledges that inorganics present in the groundwater may present additional risk (p. 6-31). EPA cannot respond to the statement that "inorganic contaminants are surely present at this site above background," since, as far as we know, background levels have not been established for this

area. New monitoring wells installed as part of the Whittier Narrows monitoring network will be sampled for inorganics.

3. The DTSC commented that for exposure pathways, residents could be exposed to contaminants of potential concern via volatilization from underground sources, but this pathway is apparently dismissed. Given that groundwater is the only contaminated media, please construct a matrix of possible exposure routes, as shown in U.S. EPA risk guidance, Exhibit 6-7.

   EPA Response - We disagree that the universe of possible exposure pathways should be quantitatively evaluated in a screening baseline risk assessment. Dominant pathways of exposure were addressed in the interim risk assessment. Because dominant pathways did not show a significant risk, it is extremely unlikely that additional pathways, such as volatilization from underground sources, would pose a significant risk.

4. The DTSC commented that on Page 6-10, Table 6-24 of the Feasibility Study Report, they do not understand the meaning of the "P" data qualifier, which is stated to be used for data for which both the "J" and "U" data qualifier apply. According to U.S. EPA guidance documents on data validation and risk assessment, the "J" and "U" categories are mutually exclusive. If an analyte is not detected, its concentration cannot be estimated.

   EPA Response - "U" and "J" categories are not mutually exclusive. A "UJ" qualifier indicates an estimated quantitation limit. The compound was analyzed for, but not considered non-detected. Because of analytical problems, the quantitation limit is approximated (estimated). The "P" qualifier means that both the "J" and "U" qualifiers apply.

5. The DTSC commented on Page 6-18 of the Feasibility Study Report, for Tables 6-4 and 6-7, the 95 percent upper confidence limit (UCL) on the mean concentration is incorrectly referred to as an "upper 95th percentile." These terms are not synonymous. The 95th percentile values for chemical concentrations would be considerably higher than the 95 percent UCLs, which are the values correctly shown on the tables. Please correct the use of these terms.

   EPA Response - We acknowledge this error. However, it does not affect the outcome of the risk assessment.

6. The DTSC commented on Page 6-4 and 6-76 of the Feasibility Study Report, Frequency of Detection - Based on Table 6-2, we tallied the ratio of the number of times

a chemical was detected to the number of samples analyzed for that chemical. Data qualified with a "J", "L", or "P" were scored as detections. These data, especially the denominators, disagree with the ratios shown in Tables 6-5 and 6-7. Since these denominators are used in the calculation of the 95 percent UCLs on mean chemical concentrations (mean $\pm$ s.d./$n^{1/2}$), these discrepancies should be resolved.

EPA Response - Monitoring Wells EPAMW011, EPAMW012, X11TMA01, and X11TMAG1 did not contain detectable levels of VOCs. As the risk assessment states (p. 6-18), these wells have not been included in the evaluation of groundwater exposures. This likely explains the inconsistency with respect to the denominators. Regarding the numerator, the inclusion of the "P" qualifier as a detection is not appropriate (see above).

7. The DTSC commented on the Dermal Exposure portion of the Feasibility Study Report. Risks from dermal exposures to volatile organic chemicals in domestic water can be greater than portrayed in this section. DTSC believes risks due to dermal exposure to volatiles in domestic water should be quantified. The most recent guidance from U.S. EPA on the subject of dermal exposure to volatiles is "Relevant Contribution of Dermal Exposure to Total Absorbed Dose," which is Chapter 9 in Interim Guidance for Dermal Exposure Assessment. The contribution of the dermal pathway for ethylbenzene, tetrachloroethene, and trichloroethene in domestic water is estimated to be between 2 and 20 percent of total exposure via ingestion, inhalation, and dermal exposure. Therefore, addition of the dermal route might be expected to increase estimates of risk by less than a factor of two. This is strikingly different from statements in the OUFS which dismisses risks from the dermal route as being several orders of magnitude less than those from ingestion and inhalation.

EPA Response - The risk assessment did not discount the dermal route based on the risks being "several orders of magnitude less than those from ingestion and inhalation" as is implied in the comment. Rather (p. 6-22), the "screening assessment does not quantitatively estimate dermal absorption from household water use because of the uncertainty associated with making a quantitative estimate of such an exposure." The risk assessment does state that the absorbed dose through dermal exposure could be several orders of magnitude less than through ingestion of tap water. We also acknowledge that the exposure could be 2 to 20 percent of the ingestion dose. Even if one were to assume these latter estimates provided by the reviewer, the conclusions of the interim risk assessment would not be affected.

8. The Water Replenishment District (WRD) of Southern California commented that the Feasibility Study Report fails in its water quality assessment of impacts to the Montebello Forebay of the Central Basin by neglecting to account for existing TCE and PCE contamination already existing in the Central Basin. The screening baseline risk assessment provided in Section 6 of the report does not take into account potential health impacts to Montebello Forebay consumers which are already receiving a background or baseline level of PCE contamination in drinking water supplies. Therefore, an assessment should be made of potential health impacts and water quality treatment requirements for Montebello Forebay wells receiving the incremental contamination from Whittier Narrows.

   EPA Response - We found the risks to be insignificant in the Whittier Narrows. The risks would still be insignificant when added to the Montebello Forebay of the Central Basin. Not knowing the background or baseline level of PCE contamination in drinking water supplies at the Montebello Forebay let us assume two different scenarios. The first scenario assumes that no other sources of contamination besides Whittier Narrows would be responsible for contamination in the Central Basin. In this case, the concentrations present in the Montebello Forebay would be predicted to be similar to concentrations in Whittier Narrows (barring the presence of an isolated spot of contamination that has already moved through Whittier Narrows) and no additional risk is predicted. For the second scenario, let us assume that the contamination is rather high in the Montebello Forebay (close to 1 in 10,000 excess cancer risk) due to other sources. In this case, the incremental risk from Whittier Narrows (assuming no dilution) would still be insignificant relative to the preexisting risk and no additional water quality treatment requirements would be necessary.

9. The WRD commented that the proposed revised Record of Decision for the Bortollo (Suburban) Well Field Operable Unit should be developed in conjunction with the Record of Decision for the Whittier Narrows Operable Unit.

   EPA Response - The monitoring of groundwater quality within the Whittier Narrows will take into account the groundwater affecting the Suburban Operable Unit. After the Records of Decision for both the Suburban and Whittier Narrows Operable Units are signed, EPA will manage these operable units together as one area. Suburban wells will also be part of the Whittier Narrows monitoring network.

10. The WRD commented that even though the average blended

water quality for subsurface flow coming through the Whittier Narrows into the Central Basin meets drinking water standards for trace organic compounds, water flowing through the Narrows at specific depths is in excess of standards for both TCE and PCE. The Feasibility Study Report should address potential remedial action at specific depth intervals for both TCE and PCE. Depth-specific production and treatment would be very effective in significantly reducing the mass transport of these industrial solvents of concern into the Central Basin.

EPA Response - The residents of Whittier Narrows and the Central Basin are exposed to groundwater that is blended from multiple aquifer zones or intervals. Discrete intervals of production wells are not points of exposure for residents. At such low concentrations (barely above MCLs), it would be premature and it would not be cost effective to initiate remedial activities for these discrete intervals. However, depth specific production and treatment may be appropriate if future data show increased contamination levels, and EPA will certainly evaluate this method if a remedial action is warranted.

11. The City of Pico Rivera requested that the City be included in the Feasibility Study for the Whittier Narrows Operable Unit so that its wells may serve as an early warning system for the Central Basin.

EPA Response - Selected wells in the City of Pico Rivera (see figure 3 of the Record of Decision) will be included in EPA's expanded monitoring network for the Whittier Narrows Operable Unit to determine the extent that contaminants from the San Gabriel Basin are impacting the Central Basin. EPA believes that the monitoring wells currently in place and the proposed new wells to be placed north of the Whittier Narrows Dam are better suited as early warning wells for the Central Basin.

*12. The California State Water Resources Control Board (SWRCB) requested clarification on, (a) how hydraulic conductivity was estimated from specific gravity tests, (b) how aquifer tests were used to determine hydraulic conductivity.

EPA Response - (a) - For specific capacity test data that included information on the duration of pumping, the transmissivity was estimated using the Cooper - Jacob approximation (1946). This methodology assumes that the drawdown is small compared to the initial saturated thickness (additional assumptions are listed in Cooper and Jacob (1946) and Bear (1979). For specific capacity test data that did not include information on the duration of pumping, the transmissivity was estimated

from the Theim equation (Bear, 1979). Hydraulic conductivity was estimated from the values of transmissivity by dividing the transmissivity by the length of the well in the saturated alluvium. As mentioned in the OUFS, additional discussion of this methodology is presented in the San Gabriel Supplemental Sampling Program Report (EPA, 1986)

(b) - Some of the aquifer test data were from tests analyzed by the California Department of Water Resources (CDWR, 1966) in their Bulletin 104-2. CDWR used the methods of Theis (1935) and Chow (1952). Aquifer test data from the monitoring wells installed by EPA in Whittier Narrows were evaluated using the Cooper-Jacob approximation (1946). These analyses assume that the well penetrates an aquifer that is homogeneous, isotropic, and of infinite horizontal extent. Additional assumptions are discussed in Bear (1979).

13. The SWRCB also commented that the equation used for calculating groundwater velocity on page A-2 of the Whittier Narrows OUFS, yields only an average velocity.

EPA Response - We agree with the comment made that the equation $V=Ki/n_e$ yields only an average velocity. The velocity calculated with this equation would represent the average velocity over the volume of the aquifer that the parameters were measured in. For example, if the gradient "i", hydraulic conductivity "K", and porosity "n_e" were estimated at two wells, the velocity would represent average velocity between the two wells. However, because hydrogeologic properties and groundwater discharge/recharge may vary between the two wells, the actual velocity at any point in space between the two wells may vary from the estimated average velocity.

In Whittier Narrows, hydrogeologic data from wells (i.e., individual, discrete points in space) are the only available data for estimating the groundwater velocity. It is thus necessary to utilize estimates of "average velocity" based on data from wells, even though the velocity may vary between the wells. Because another draft of the OUFS report will not be produced, we will unfortunately not be able to add more text to further clarify this point. The average velocity estimated could be used to estimate the average velocity for transport of a contaminant if the contaminant travelled at the same velocity as the groundwater.

*References

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